

What is claimed is:

1. A reductase comprising

i) an amino acid sequence of SEQ ID NO:1 having  
a substitution at amino acid position 245 or 271 or  
at both of the amino acid positions 245 and 271, or

ii) an amino acid sequence as defined in i)  
having further substitution, deletion, or  
addition of an amino acid or acids;

2. A reductase according to claim 1, which comprises  
an amino acid sequence of SEQ ID NO:1 having a  
substitution at amino acid position 245 or 271 or at  
both of the amino acid positions 245 and 271;

3. A reductase according to claim 1 or 2, wherein  
said substitution is a single amino acid substitution at  
amino acid position 245 in the amino acid sequence of SEQ  
ID NO:1.

4. A reductase according to claim 1 or 2, wherein  
said substitution is a single amino acid substitution at  
amino acid position 271 in the amino acid sequence of SEQ  
ID NO:1.

5. A reductase according to claim 1 or 2, wherein  
the amino acids at positions 245 and 271 of the amino acid  
sequence of SEQ ID NO:1 are substituted a same amino acid  
or different amino acids.

6. A reductase according to claim 3 or 5, wherein  
the amino acid at amino acid position 245 is substituted  
with arginine.

7. A reductase according to claim 4 or 5, wherein  
the amino acid at amino acid position 271 is substituted

with aspartic acid.

8. A reductase according to claim 1, wherein  
the amino acid at amino acid position 245 of the  
amino acid sequence of SEQ ID NO:1 is substituted with  
5 arginine, and the amino acid at amino acid position 271 of  
the amino acid sequence of SEQ ID NO:1 is substituted with  
aspartic acid.

9. A polynucleotide sequence comprising a  
polynucleotide sequence encoding an amino acid sequence of  
10 the reductase of claim 1 or 2.

10. A vector comprising the polynucleotide of claim  
9.

11. A transformant comprising the polynucleotide  
sequence of claim 9 or the vector of claim 10.

15 12. A vector according to claim 10, which further  
comprises a polynucleotide sequence encoding an amino acid  
sequence of a protein capable of converting an NADP or an  
NAD into NADPH or NADH respectively.

13. A transformant of claim 11, which further  
20 comprises a polynucleotide sequence encoding the amino acid  
sequence of a protein capable of converting an NADP or NAD  
into NADPH or NADH respectively.

14. A method for producing (S)-halo-3-  
hydroxybutyrate ester, which comprises reacting 4-halo-3-  
25 oxobutyrate ester with the transformant of claim 11 or  
claim 13 or a treated material thereof.

15. A method for modifying an enzyme, which  
comprises substituting at least one of the amino acids at  
positions 245 and 271 of the amino acid sequence of SEQ ID

NO:1 respectively with another amino acid(s), thereby heat stability of said enzyme in the reduction reaction is improved.

16. A method for producing a modified enzyme gene,  
5 which comprises replacing at least one codon corresponding to the amino acids at positions 245 and 271 of the amino acid sequence of SEQ ID NO:1, with another codon or codons corresponding to an amino acid(s), in a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:1.

10